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FROM: DCOL

21 February 1967

SUBJECT: Life Support Equipment Meeting

TO: Comdr *W*

THRU: DCO

1. A life support equipment meeting was held at on 15-16 Feb 67. 25X1A
The following personnel were present:



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2. Review of recent accident board recommendations and what action has been taken:

a. Head-rest spacers: Have been removed from all aircraft and the eight nuts and bolts on the front of the seat securing the rotary actuator straps have been reversed. Action was completed 11 January 1967.

b. Apply smooth surfaces to headrest underside and top of drogue chute: LAC presented two prototype shoulder harnesses. One prototype had the strap reworked to make a smooth "Y" and new smaller buckles were used to present a smaller profile. The other prototype had no buckles and could be slipped through the loop at the "Y" making it possible to fit each pilot with his individual shoulder harness measured to size. During the cockpit evaluation each pilot was placed in the seat and shoulder harness measurements taken. LAC designing a new headrest with smooth underside and slightly greater angle. Firewell agreed to stiffen the drogue cover flap to provide a smooth surface at top. They are to spray coat with teflon. Estimated completion date for LAC and Firewell is 27 Feb 67. Inflight testing evaluation will be required.

c. Reposition rotary actuator straps to provide maximum forward thrust to man/parachute mass: LAC is working on this item presently. They have made a prototype headrest assembly for tentative static testing. This headrest has a sharper angle on the underside and the rotary actuator strap from the actuator is modified. A single strap comes from the actuator forward to a spool located farther out on the headrest. From the spool comes two straps down the underside of the headrest and on down the back of seat and bottom. The ends are then attached to the forward pan of the seat. LAC will have movies to determine how much testing will be required. Target date is June 1967.

USAF review(s) completed.

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d. Lap belt automatic release mechanism reworked to prevent tension on load binding of paw latch lever and development of a readily accessible manual release lever. LAC provided a prototype of modified lap belt. The automatic release mechanism will have a larger opening in the fish mouth to prevent binding and the hook and piston area needs to be reworked. LAC also plans to relocate the shear pin to bottom side of piston housing. The manual release lever was modified with a velcro locking strap. Static test report should be available from LAC in approximately four weeks.

e. Shoulder harness loops sewn to prevent slipping over automatic release housing. A steel former is to be installed in the loop to assure maintaining its size specification. Inflight testing will be required. Target date is 27 February 67.

f. Expedite faceplate heat and protective controller cover: LAC and Firewell presented a prototype model. The batteries to power the faceplate heat are located in the back pan cover of parachute. A cord was added to the existing communications cord. The battery power is activated when green apple (O₂ knob) is pulled and will automatically be activated upon ejection from aircraft. Requires high Q and whirl tower testing. Will be tested with planned package parachute testing program. No date yet set for parachute testing program.

g. D-Ring cable cutter installation: No action was taken at this time. LAC [] stated that this was a very difficult modification because of lack of space due to other equipment being located in this area.

h. Lap belt adjustment lock: This item will be available at [] 1 March 67 and will be tested and evaluated at that time. Prototype was evaluated and accepted last month with the provision that it be static tested to assure adequate clearance of arm rotors.

3. Prototype life support items:

a. Positive visor hold down latch: Prototype shown and is now available for ground test and evaluation by pilots for one week. If accepted, a kit will be supplied by D.C. to be installed by [] Target date is 30 to 45 days from when accepted. David Clark stated that too much bulk would have to be added to protect the visor knob.

b. Automatic survival kit deployment: Rocket Jet presented two prototype kits for inspection and discussion. One was the present kit modified slightly to house the automatic release mechanism in the left leg extension. The other kit is a new kit with the mechanism mounted outside and under the leg extension with a separate cover. The automatic release mechanism is set at nine seconds after man-seat separation. It can be set from 3000 to 18000 feet. The unit weight is 3.6 pounds, but take up very little space. It has a ground safety pin which the P.E. technician will remove after pilot is loaded. Both kits have manual override capability. Advantages and dis-

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advantages of both kits were discussed and the modified version of our present kit was favored. Three [] kits are to be sent to [] for modification following the required drop, shock and vibration tests to qualify it. Target date is 30 to 45 days.

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c. Controller cover: LAC presented a prototype cover made of fiber glass to give protection to controller and fittings. [] Firewell personnel will make local modification to make press-to-test more accessible for maintenance. No testing is required because it was evaluated during the cockpit evaluation session and accepted. This item is available now. However, if it proves not to serve any purpose after other modifications to lap belt is made, this item will no longer be used.

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d. URT-27 Beacon installation: Firewell presented prototype. Parachute personnel stated it packed very well. Modified version will be made for testing. Cover needs to be modified with draft and flush mounted. Also the cover flap needed minor modification. Requires whorl tower testing. Target date is 27 Feb 67.

e. Hose to controller connections: It was recommended and accepted to redesign hose fittings to forged solid type. Testing is not required due to LAC test report. It was also recommended that if one section is built up, the other end should be. Target date is 27 Feb 67.

f. Status report on automatic life raft boarding system: This item is still not acceptable and needs more development. No target date was established.

4. Cockpit evaluation and discussion of prototype life support modifications:

a. Parachute modification (cockpit measurements): From measurements taken 15 Feb 67 with all subjects seated in the seat, it is felt that there is no need to modify the parachute. All subjects were able to touch the headrest unpressurized. It was noted that the rear tail of the standard cushion did not raise the parachute significantly to warrant removing it, as compressed it measured approximately 3/8". This configuration does fall within the allowable C.G. It was also noted that subject 1054 uses a non-standard cushion and there is some question if he is within the allowable C.G. pattern. [] stated that this would require LAC/[] action following a C.G. test with all subjects evaluated, it was found that with minor adjustments on the helmet hold down strap and the seat kit straps, the subject was able to come nearer and in some cases touch the headrest when pressurized. As a further evaluation, the shoulder harnesses was measured from loop to loop after each subject got out of the seat to establish the size shoulder harness for each one, should the non-buckle individual shoulder harness prove satisfactory. Estimated date of production was 27 Feb 67. Action LAC.

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b. Cockpit evaluation of outer cover modification:

(1) Inflation bladder: Inflator was moved over so as to be accessible with either hand. The knob will be such that it is still easy to get a hold of

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but not so vulnerable for inadvertent pulling (go back to plastic knob). There are three coveralls at [redacted]. First thing is to change the knob and look for a smaller better knob. At the same time a redesigned knob should be studied by David Clark. Question was raised as to possibility of placing it under the lap belt as it would not and should not be used until after lap belt is gone.

(2) Lap belt/suit controller cover capability: Is it really a necessity since the fittings are now redesigned and stronger? Also the cover was more vulnerable to damage from the lap belt than the original open controller. [redacted] stated that he did not see a need for it and recommended that it not be used. However, it was recommended that LAC install a leather tab on lap belt to cushion shock against hose hardware.

(3) Horse collar: No problem with parachute compatibility in cockpit. This suit will be returned to David Clark for modifications. It was found that during the pool test the [redacted] releases were obstructed by the collar when inflated so that it was very difficult to release properly and safety. This knob should also be reduced in size. The horse collar does keep the man on his back, however, it does not raise him up out of the water any great amount. It was suggested to look at a little more floatation located in small of back to counteract the excessive front bladder. Target date 30 to 45 days.

c. Pool test:

(1) Horse collar was discussed above.

(2) Open end raft: When worked as designed, it was excellent. The rear section lifted legs of pilot into raft. The CO₂ bottle must have a blast bag to prevent severe freezer burn damage. Raft still needs stability tests and some modifications. David Clark is to work on reducing the bulk for packaging in kit. One recommendation was to use a single floor instead of the inflatable floor. Another was to put a spring spreader in the stability buckets and additional hand holds on front of raft. For development purposes color was not a question at this time. When the raft is ready for final testing a kit should be made available to David Clark for packing. In the meantime [redacted] should send dimensions of raft package size to [redacted] as soon as possible.

d. Automatic inflators: This item is available but reliability was questioned. Three automatic inflators were satisfactorily demonstrated at the pool. It was decided that this was an operational decision at this time. Action [redacted] (Discussion included using the manual actuator with a bleed or pop-off valve on the floatation garment and the automatic inflators on the horse collar floatation item if accepted). The aneroid relief valve would be excellent for altitude, however, very poor at low level. Beale decided to take out the bleed feature and expose the oral inflation tube so as to be readily accessible to the pilot. [redacted] has made a study of this problem and [redacted] recommended that we request this information. It was recommended by [redacted] that if the horse collar floatation assembly is accepted with the automatic inflator, the

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pop-off valve should be used on the suit floatation garment and a pre-determined altitude be set from the information obtained from [] data.

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e. Heated gloves: David Clark is still looking for an automatic means of initiating this item. No prototype was presented. A feasibility study is being made by David Clark at this time. [] stated that they would have a prototype in the next four months. Question was raised as to its adaption to the same system that activates the face plate heat.

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f. Super spacer: Pilots evaluated this garment as unsatisfactory due to excessive bulk, and lack of requirement with advent of new more efficient cooling modification in aircraft. It was decided that since this is not a part of the emergency cooling thermal package, this item will be taken out of the suit but kept on hand.

g. Improved visor up-lock: David Clark stated that this is made possible by simply tightening up the tolerance. [] is to check all present equipment to see what replacement items are needed. This improvement will be taken care of locally.

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h. Helmet interliner: A new G.I. standard jet helmet interliner is now a standard item. Pilots have requested the use of this interliner in their pressure suit helmets. [] was using an interliner very similar to this and suggested we check stock numbers. He said that he would look into it and [] is to call [] as soon as he finds if this is acceptable.

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i. Emergency cooling system: There is still a requirement for an emergency suit cooling system. Firewell has submitted a proposal for supplemental cooling, but not for a complete emergency cooling system. [] stated that they would submit a proposal for a short duration emergency suit cooling system. Firewell requested that they be sent all thermal analysis information that is available. [] is to check with Wright Patterson. [] is to provide a description of the emergency situation and Wright Patterson is to provide what ever stress levels are available. Firewell will then take this data and attempt to simulate at Buffalo. The constant flow helmet is a part of the effort in the emergency cooling thermal package and will be evaluated in the near future. The helmet is at [] ready to go and the temperature sensing oxygen shut off valve is being installed in one of the aircraft. This evaluation data will also be given to Firewell. No target date was set at this time.

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j. LEV shades: The LEV shades are also a part of the emergency cooling package. Pilots who have already evaluated this item feel that its disadvantages over ride its advantages. The major disadvantages are increased reflective problems and the surface scratches very easily causing distortion. Subject 1054 has requested another flight for further evaluation. Recommended that we take another look at this item.

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k. []visor: David Clark stated that they were still looking for a heating wire area improvement and hope to have a modified version in 3 to 4 months. Subject 1054 was advised that his []visor had been shipped from the factory and should arrive soon.

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l. D-handle vs T-handle on cygnus parachutes: Subjects requested an investigation be made as to the redesigning of a better ripcord handle somewhat more like a D-handle that they could get their fingers into. [] stated that Firewell would investigate the possibility of this and advise. [] stated that he would request research data on the present T-handle from Wright Patterson.

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m. Life raft pop-off valve: At the present time there is not a life raft pop-off valve in existence. Firewell and LAC will continue to research. [] stated that they would work on a prototype puncture spike to be installed in the kit at a location that should the raft inadvertently inflate, it would be punctured during expansion in the kit.

n. Beacon activation: Firewell stated that a dual antenna could be rigged by use of a standard antenna T-connection, so that one antenna would go to the drogue and the other to the main chute. Question was raised as to how much more effective this would be. [] stated that it would give additional range initially, and add two to three minutes to duration. It was also recommended to check on the feasibility of having an extra beacon in the seat that will activate upon ejection. Firewell is to look at both suggestions and come up with a proposal in the next 30 days.

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5. Test program discussion:

a. Questionable items concerning jump test:

(1) Quick disconnect spurs. It was decided that the quick disconnect spurs had received adequate testing and evaluation, however, that they would be included on the future test program as an additional safety procedure.

(2) ASKIT: This kit has never been test jumped in the pressure suit packet, however, it has been test jumped in a standard air force flying suit and found satisfactory. Also this kit was in the pressure suit packet of subject 1051 during a low level emergency escape and was found to be intact. The kit will also be installed in the pressure suit packet during the future program tests.

(3) Survival seat cushion: This survival seat cushion has never been high speed test jumped, however, it was a part of the equipment when subject 1051 and 1045 ejected. This seat cushion will also be a part of the test program.

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b. Test program for life support and personal equipment items discussed at this meeting: A test program is to be proposed in the near future by [REDACTED] This is to be a coordinated effort by all participants to test the equipment discussed at this meeting. Time of test program to be determined by project headquarters.

c. Each participant at this meeting has been requested to forward their response to this meeting to [REDACTED]

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[REDACTED]

Captain, USAF
Asst Chief, Life Support Division

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